

Readme Document for the Control Measures Reference Library

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1.0 Introduction

This document covers the methodology used to research and develop the Control Measures Reference Library (CMRL), a database that compiles a list of control technologies across various source categories. The data captured and the scope encompassing the CMRL is limited to the references researched and described within this document; the CMRL is not meant to be an exhaustive list of measures but a representation of existing measures. In addition, permit searches conducted when a control technology was not found were limited and not fully exhaustive. It would be appropriate for a user to research permits for the source sector or sub-sector to identify any permits that may exist for the control technology of interest. This work was supported by Eastern Research Group, Inc. (ERG). The following sections of this readme file provide:

- Summary of EPA resources that are included in the CMRL.
- Summary of the methodology used to fill gaps in information.
- Explanation of the current CMRL formatting and how it can be utilized.

2.0 Control Measures Reference Library Resources

The following EPA resources were used as a starting point of research for populating the CMRL.

2.1 Ozone Transport Region States

The Ozone Transport Region (OTR) is a collection of 13 northeastern states that was established by the Clean Air Act (CAA) in 1990 to help combat ground level ozone. These states are required to submit a reasonably available control measures (RACM) and reasonably available control technology (RACT) State Implementation Plan (SIP) that evaluates the technological and economic feasibility of certain controls for ozone precursors and, where feasible, to install those controls. The following states make up the OTR:

- 1) Connecticut
- 2) Delaware
- 3) District of Columbia
- 4) Maine
- 5) Maryland
- 6) Massachusetts
- 7) New Hampshire
- 8) New Jersey
- 9) New York
- 10) Pennsylvania
- 11) Rhode Island
- 12) Vermont
- 13) Virginia

These states have 8-hour ozone nonattainment areas ranging from Moderate to Severe, making the OTR states an appropriate starting point of data collection for the CMRL. ERG started by locating each state's EPA-approved 2015 ozone RACT regulations with a focus on major stationary source RACT for volatile organic compounds (VOC) and nitrogen oxides (NO_x), the precursors for ozone. In addition to finding

RACT, each of these states also include EPA Control Technique Guidelines (CTG) for a number of VOC source categories, so these regulations were included as well.

2.2 State and Federal Implementation Plans

2.2.1 State Implementation Plans

ERG focused on the following nine SIPs:

- 1) 2008 Ozone Moderate SIP Action – Dallas-Fort Worth (DFW) and Houston-Galveston-Brazoria¹ (HGB) Areas (2016 Oil and Natural Gas CTG revisions)
- 2) 2008 Ozone Moderate SIP Action – HGB Area²
- 3) 2008 Ozone Moderate SIP Action – Connecticut portion of NY Area³
- 4) 2015 Ozone Moderate SIP Action – Connecticut portion of NY Area⁴
- 5) 2008 Ozone Moderate SIP Action – Denver Metro/North Front Range, CO⁵
- 6) 2015 Ozone Moderate SIP Action – NY portion of NY Area (also includes 2008 Serious Area Plan)⁶
- 7) 2015 Ozone Moderate SIP Action – NY portion of NY Area (2022 revisions)⁷
- 8) 2012 PM_{2.5} Moderate SIP Action – San Joaquin Valley, CA⁸
- 9) 2012 PM_{2.5} Moderate SIP Action – South Coast, CA⁹
- 10) 2008 Ozone Serious SIP Action – Illinois¹⁰
- 11) 2015 Ozone Serious Action – Philadelphia Area¹¹

These nine SIPs represent a range of states across the country and offer a large range of control technologies to supplement the findings in the OTR states with VOC, NO_x, and particulate matter (PM).

EPA provided the *Federal Register* (FR) notice for each of these actions and provided supporting documentation from the docket to locate the RACT/CTG/Best Available Control Technologies (BACT)/Best Available Control Measures/Most Stringent Measures (BACM/MSM) regulations. ERG then obtained the state regulation that matched regulation in the SIP for the CMRL.

2.2.2 Federal Implementation Plans

ERG focused on the following four Federal Implementation Plans (FIPs):

- 1) Arizona Partial FIP (2012)¹²
- 2) Arkansas FIP (2016)¹³

¹ <https://www.regulations.gov/document/EPA-R06-OAR-2021-0525-0011>

² <https://www.regulations.gov/document/EPA-R06-OAR-2017-0055-0009>

³ <https://www.regulations.gov/document/EPA-R01-OAR-2016-0168-0023>

⁴ <https://www.regulations.gov/document/EPA-R01-OAR-2022-0113-0010>

⁵ <https://www.regulations.gov/document/EPA-R08-OAR-2017-0567-0041>

⁶ <https://www.regulations.gov/document/EPA-R02-OAR-2022-0648-0037>

⁷ <https://www.regulations.gov/document/EPA-R02-OAR-2021-0572-0007>

⁸ <https://www.regulations.gov/document/EPA-R09-OAR-2021-0543-0153>

⁹ <https://www.regulations.gov/document/EPA-R09-OAR-2019-0145-0196>

¹⁰ https://archives.federalregister.gov/issue_slice/1980/2/21/11470-11495.pdf#page=3

¹¹ <https://www.federalregister.gov/documents/2021/11/01/2021-22571/air-plan-approval-pennsylvania-reasonably-available-control-technology-ract-determinations-for>

¹² <https://www.govinfo.gov/content/pkg/FR-2014-09-03/pdf/2014-15895.pdf>

¹³ <https://www.govinfo.gov/content/pkg/FR-2016-09-27/pdf/2016-22508.pdf>

- 3) New York Partial FIP (2012)¹⁴
- Nevada Partial FIP – Reid Gardner Generating Station (2012)¹⁵

These FIPs are more specific than SIPs. Each of these FIPs has a list of specific facilities with specific emission units that are required to submit a Best Available Retrofit Technology (BART) determination to the EPA. If the EPA approves the determination, then it becomes a requirement for the facility to follow.

EPA provided the FR notice for these four plans to include in the CMRL.

2.3 NSPS and NESHAPs

ERG was instructed to include criteria pollutant emission limits and corresponding control technologies/techniques for the following fourteen New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP):

- 1) Synthetic Organic Chemical Manufacturing Industry (SOCMI) NSPS (40 CFR Part 60, Subpart III, NNN, and RRR)
- 2) Oil and Natural Gas Section NSPS (40 CFR Part 60, Subpart OOOOb)
- 3) Petroleum Refineries NSPS (40 CFR Part 60, Subpart Ja)
- 4) Hydronic Heaters and Forced Air Furnaces NSPS (40 CFR Part 60, Subpart QQQQ)
- 5) Gasoline Distribution Bulk Terminals, Bulk Plants, and Pipelines Facilities Area Source NESHAP (40 CFR Part 63, Subpart BBBBb)
- 6) Stationary RICE NESHAP (40 CFR Part 63, Subpart ZZZZ)
- 7) Petroleum Refineries NESHAP (40 CFR Part 63, Subparts CC and UUU)
- 8) ICI Boilers and Process Heaters NESHAP (40 CFR Part 63, Subparts DDDDD)
- 9) Stage I Gasoline Distribution NESHAP (40 CFR Part 63, Subpart R)
- 10) Generic MACT Standards NESHAP (40 CFR Part 63, Subpart YY)
- 11) Hazardous Organic NESHAP (40 CFR Part 63, Subparts F, G, H, and I)
- 12) Miscellaneous Organic NESHAP (40 CFR Part 63, Subpart FFFF)
- 13) ICI Boilers Area Source NESHAP (40 CFR Part 63, Subpart JJJJJ)

3.0 Control Measures Reference Library

The CMRL is an Excel spreadsheet populated with emission limits and control technologies/techniques found in the resources described in the previous sections. The CMRL currently holds approximately 5,500 rows of data that describe multiple source sectors and sub-sectors. The columns in the CMRL are filterable to easily sort through the data and distill down to a specific source category and emission unit type. Table 1 describes each column of the CMRL with examples of how the data appear.

¹⁴ <https://www.govinfo.gov/content/pkg/FR-2012-08-28/pdf/2012-21056.pdf>

¹⁵ <https://www.govinfo.gov/content/pkg/FR-2012-08-23/pdf/2012-20503.pdf>

Table 1. Control Measures Reference Library Data Field Guide

Column Name	Description	Example(s)
Row ID	Alphanumeric ID that is unique. First few letters help to identify the area/regulation. The numeric digits are assigned consecutively.	DC000198
State	Two letter state abbreviation.	NY
NAAQS/Regulation (including OTR) (if applicable)	Type of nonattainment area or Federal regulation.	Ozone 2008 (8-hour) Moderate; Petroleum Refineries NSPS (Part 60 Subpart Ja)
Pollutant	Main pollutant controlled by the control measure. Only control measures for ozone and PM precursors (VOC, NO _x , SO ₂ , PM _{2.5} , PM ₁₀ , and ammonia (NH ₃)) are included.	VOC; NO _x
Nonattainment Area/OTR State/Federal	Nonattainment area or OTR state to which the rule applies (if applicable).	Houston-Galveston-Brazoria Nonattainment Area; Virginia; Federal
RACT, RACM, FIP, NSPS, NESHAP, CTG	Type of regulation to which the data entry applies.	RACT; CTG
Source Sector ¹⁶	Type of source affected by the control measure.	Solvent - Industrial Surface Coating & Solvent Use; Fuel Comb - Electric Generation
Sub-sector/CTG Category (if applicable) ¹⁷	Type of emission unit/source affected by the control measure (more specific than Source Sector).	Automobile and Light-Duty Truck Coatings; Industrial Boilers
Notes	Any additional information that helps describe the data. May include dates, exemptions, more information about the emission unit, more information about the control measure, etc.	Emission limit for spark ignited rich burn engines >2400 HP On or after May 1, 2003
Applicability Threshold	Applicability threshold that must be met in order for the control measure/emission limitation to apply.	> 5 MMBtu/hr; > 15 lb/day VOC
Fuel Type (for Combustion Sources)	Type of fuel used to power the emission source, if applicable. Combustion sources include boilers, process heaters, turbines, furnaces, etc.	Coal; Oil
Control Technology/Emission Reduction Option	The control technology or measure used to reduce emissions.	Good Combustion Practices; Selective Catalytic Reduction; Low-VOC coatings

¹⁶ Derived from the Sector pulldown menu under Data Queries, Sector Summaries
<https://www.epa.gov/air-emissions-inventories/2020-nei-supporting-data-and-summaries>

¹⁷ No preliminary list was available. List was developed and compiled as documents were researched and records entered into database.

Table 1. Control Measures Reference Library Data Field Guide (Cont.)

Column Name		Description	Example(s)
Emission Limit(s)	Limit 1	Numerical emission limit required by the rule.	0.036
	Limit 1 Units	Units for Emission Limit 1.	lb/MMBtu
	Limit 1 Averaging Time	Averaging time for Emission Limit 1.	Hourly
	Limit 2	Additional numerical emission limit required by the rule.	115
	Limit 2 Units	Units for Emission Limit 2.	ppmv
	Limit 2 Averaging Time	Averaging time for Emission Limit 2.	Daily
Link to EPA Approval FRN		Link to approval of the regulation/SIP/FIP in question. This is typically a federal register notice but could also be a link to the EPA website.	Hyperlink
Link to document or rule where requirement is described		Link to the text where the emission limit and control technology/technique is found. This is regulation/rule text more often than not.	Hyperlink

EPA expects that users of the CMRL will begin by sorting by Sub-sector/CTG Category. This may seem counterintuitive rather than starting with sorting by Source Sector, but the list of Sub-sectors is specific enough to quickly find what the user is looking for, but not too specific that the list is too long to browse. Once filtered by Sub-sector, the user should review the Notes column to ensure they find the desired emission unit. The Applicability Threshold and Fuel Type columns should also be considered to further refine the list of records to help users find their desired information, especially when looking for combustion sources; however, they are not always populated.

Once the user has filtered the CMRL to the desired Source Sector and Sub-sector, the emission limits and various control technologies should be easily accessible. The Control Technology/Emission Reduction Option column can have multiple entries for the same emission unit. For example, an industrial boiler emitting NO_x can be controlled by selective catalytic reduction (SCR), low NO_x burner, etc. Additionally, sometimes the control technology may be listed as “Add-on controls” or “Control device (unspecified).” In these cases, the regulations/SIPs/FIPs did not specify a technology and simply provided a limit the emission unit must comply with. It is assumed in these cases that the facility will use any control technology they choose to meet the emission limit. If there is any confusion, the user can click on the hyperlink in the “Link to document or rule where requirement is described” to look more in depth at the underlying rule text.

Currently there are 213 “Control device (unspecified)” or “Add-on controls” records in the CMRL. Table 2 describes how these unspecified records are broken out.

Table 2. Percentage of Unspecified Records in the Control Measures Reference Library

Percentage of Unspecified (Total)		Percentage of Unspecified (OTR)		Percentage of Unspecified (SIP/FIP)		Percentage of Unspecified (NSPS/NESHAP)	
Unspecified	Total Records	Unspecified	Total OTR Records	Unspecified	Total SIP/FIP Records	Unspecified	Total NSPS/NESHAP Records
215	5,492	31	3,750	184	1,591	0	151
	4%		1%		12%		0%

4.0 Summary

The CMRL presents widely used control technologies and other information across a variety of source categories and emission units. In-depth research was conducted of SIP, FIP, NSPS, and NESHAP control requirements by source category and emission unit type with the goal of including nearly every source category/emission unit type that would be commonly found in any given state. In addition, the CMRL is formatted in a way that can be easily expanded with additional control measure entries and examples. The CMRL will be a useful resource for any state or local government air quality agency that is preparing a SIP.